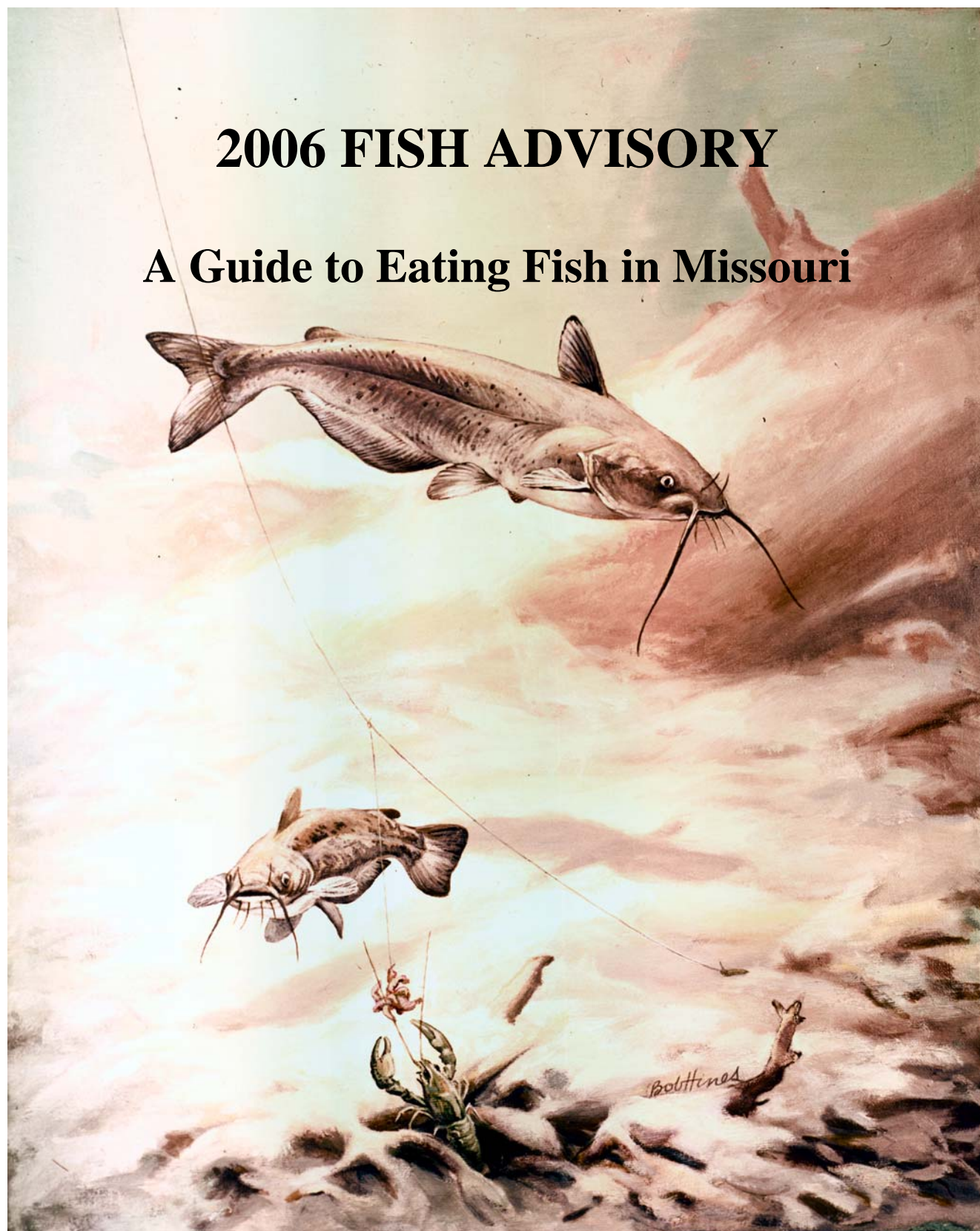




MISSOURI DEPARTMENT OF HEALTH AND SENIOR SERVICES

# **2006 FISH ADVISORY**

## **A Guide to Eating Fish in Missouri**



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## FISH ADVISORY SUMMARY

The 2006 Fish Consumption Advisory is summarized in the table below. Some new information has been evaluated this year, and **the recommendations regarding fish consumption have changed from the 2005 advisory**. Please read the entire advisory to learn of continuing evaluations and of trends (local and national) that may influence future advisories. The Department of Health and Senior Services (DHSS) recommends that **all consumers** be aware of the positive benefits of eating fish **and** the potential adverse health effects from mercury in fish.

| Location/<br>Contaminant  | Advisory  | Species  |
|---|---|--|
| Statewide<br><br>Mercury  | <b><u>Sensitive Populations</u></b><br>Pregnant women, women of childbearing age, nursing mothers, and children under 13 years old should <b>limit consumption</b> to:<br><b>1 meal/month:</b> Bass species (Largemouth, Spotted, and Smallmouth) greater than 12 inches,<br><b>2 meals/week:</b> Carp greater than 21 inches.  | Largemouth Bass, Spotted Bass, and Smallmouth Bass, Carp species                     |
| Mississippi and Missouri rivers<br><br>PCBs, chlordane, mercury | <b><u>All Consumers</u></b><br><b>Do not eat:</b> Sturgeon eggs collected from these waters.<br><b>1 meal /month:</b> Shovelnose Sturgeon fish tissue (excluding eggs).<br><b>1 meal/week:</b> Flathead, Channel, and Blue Catfish greater than 17 inches.  | Shovelnose sturgeon, flathead catfish, channel catfish, and blue catfish.            |
| Big and Flat rivers, Big Creek<br><br>Lead                      | <b><u>All Consumers</u></b><br><b>Do not consume:</b> Sunfish, carp, redhorse, and other suckers found in the Big River in St. Francois and Jefferson counties, the Flat River in St. Francois County from Highway “B”, six miles downstream to where it enters the Big River.<br><b>Do not consume:</b> Sunfish from Big Creek near the town of Glover in Iron County, Missouri. | Sunfish (some times also known as bream or perch), carp, redhorse, and other suckers |
| All other water bodies<br><br>Mercury                           | <b><u>Sensitive Populations</u></b><br><b>1 meal/week:</b> All other fish found in Missouri waters as per EPA’s recommendation because all fish have various levels of mercury  | All other fish not covered under an advisory   |



## BACKGROUND INFORMATION

The Missouri Department of Health and Senior Services (DHSS) believes that people should eat a healthy diet. Fish is a good source of high-quality protein and essential nutrients that will contribute to a healthy diet if eaten regularly. Fish is low in cholesterol and some types of fish have fats (omega-3 fatty acids) that may be beneficial in reducing heart disease. Along with the potential benefits to eating fish, DHSS believes that it is important to consider any potential risks associated with consuming Missouri sport-caught fish. In association with this goal, the Missouri Department of Conservation (MDC) has conducted extensive annual sampling and analysis of contaminants in Missouri's fish since 1985. The Missouri Department of Natural Resources (MDNR) also conducts fish sampling in cooperation with the U.S. Environmental Protection Agency (EPA). DHSS' Bureau of Environmental Epidemiology reviews the results of sampling by both agencies to determine if eating Missouri fish poses a public health risk.

Because DHSS uses the latest EPA assessment methodology and updated local fish tissue information, Missourians may see changes to the advisory each year. DHSS combines information on sport-fish consumption patterns with EPA's methodology to create fish consumption recommendations that are specific to Missouri.

## SENSITIVE POPULATIONS

DHSS will refer repeatedly to **sensitive populations** throughout the advisory. Sensitive populations are women who are pregnant, women of childbearing age, nursing mothers, and children under 13 years of age. The sensitive populations may have health-protective restriction recommendations because growth and development happens rapidly in young children. These restriction recommendations are designed to protect children.

## FISH CONSUMPTION LEVEL ADVISORIES

Five consumption level advisories are as follows:

- Level One: Fish are safe for **unrestricted consumption, except for sensitive populations.\***
- Level Two: Fish are safe for **limited consumption**. Consume no more than **two meals a week** (104 meals a year).
- Level Three: Fish are safe for **limited consumption**. Consume no more than **one meal a week** (52 meals a year).
- Level Four: Fish are safe for **limited consumption**. Consume no more than **one meal a month** (12 meals a year).
- Level Five: **No consumption** of fish (Do not eat).

**One meal** is 11 ounces of uncooked fish for a 150-pound person and 3 ounces for a 40-pound child. The 11-ounce meal is approximately equal to the size of two decks of cards.

\* Those persons should eat no more than one (1) meal per week as recommended by EPA 2004 *National Advisory for Mercury*. This recommendation is to provide a baseline of protection from mercury contamination.



## STATEWIDE ADVISORY--Mercury

DHSS reevaluated the consumption advisory for Largemouth Bass and other recreational fish species to determine if limited-consumption advisories could be implemented. Previously, DHSS advised sensitive populations not to eat any Largemouth Bass over 12 inches. Results of this year's evaluation indicate that **mercury** levels in some Missouri fish could pose a possible health risk to our children. Therefore, after careful consideration, DHSS changed the mercury advisory for **sensitive populations** to the following:



- 1) **Level-Four limited-consumption advisory (no more than one meal a month) for Largemouth Bass, Smallmouth Bass, and Spotted Bass over 12 inches in total length,**
- 2) **Level-Two limited-consumption advisory (no more than two meals a week) for carp species over 21 inches in total length.**

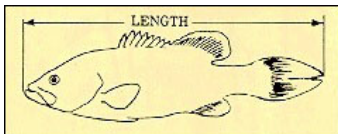


In addition, those individuals in the sensitive populations can eat legally-caught bass species smaller than 12 inches in length, because these fish are younger, they consume smaller prey, and have not consumed enough fish over a long enough time period to have elevated levels of mercury in their bodies (See the additional mercury information below).

**All other adults and children 13 years of age and older** should be aware of the positive benefits of eating fish **and** the potential adverse central nervous system and cardiovascular effects from mercury in fish. See this EPA's website for more information:

<http://www.epa.gov/waterscience/fishadvice/advice.html>

Mercury was found in the fillets of nearly all fish species. The available information for sunfish, suckers, channel catfish, and several other fish in Missouri waters is not comprehensive. The information that we have indicates variable amounts of mercury in those fish by location and size. Because of the absence of comprehensive information on all fish species, DHSS has issued **Level-One consumption advisory (unrestricted consumption) for all other sport fish** (see Nationwide Consumer Information on Mercury below).



### Additional Mercury Information

Sampling and analysis of fish indicate that mercury contamination is widespread, and present in fish in streams, rivers, ponds, and lakes throughout Missouri. The amount of mercury in fish seems to be mostly related to their size and the type of food that they eat. For example, large fish that eat other fish have higher concentrations of mercury than smaller fish or fish that eat creatures that live on the bottom. The contamination observed in Largemouth,



Smallmouth, and Spotted basses and carp species is widespread in Missouri and that is why our advisory is for the whole state. The MDC and MDNR are committed to the continued collection and analysis of predatory fish such as bass, walleye, and other selected species to determine mercury concentrations. These efforts will provide DHSS with the contaminant information necessary to issue additional advisories, if the need arises.





The reason that mercury seems to be distributed throughout the state is because of the way it got here. Mercury is a naturally occurring element that has been used by man in many ways for thousands of years. It is found in coal, thermometers, electrical switches, batteries, and is used in many mining and manufacturing processes as well as some cultural and religious practices. Over time, some of this mercury was released or improperly discarded. Today, we release mercury when we burn municipal trash, when we burn coal to produce electricity, or to heat or power buildings and factories. Once this mercury is released to the atmosphere, it can travel great distances before it settles back to the earth and enters our streams, rivers, ponds or lakes. During its movement through the atmosphere, land, and water, mercury undergoes a series of complex chemical transformations. One of the products of these transformations is the organic form called methylmercury. From there, it is absorbed by microscopic plants and animals, which are eaten by small animals and fish that are in turn eaten by bigger and bigger fish. This causes the mercury to become most concentrated in the larger predatory fish.

For more information about how mercury is distributed throughout Missouri, see the Missouri Department of Natural Resources' fact sheet titled: "Mercury in Missouri Streams and Lakes," which is available on the Internet at: <http://www.dnr.mo.gov/pubs/pub2100.pdf>.

Mercury is found in many fish species. The table below shows recently sampled fish that had mercury in their fillets. For information on mercury levels in a particular fish species, contact the DHSS at (573) 751-6102 or toll free at (866) 628-6946.

### **Fish with Mercury in Fillets from the Statewide Fish Contaminant Sampling**

| <b>Bottom Feeders</b> | <b>Insect/Other Types of Feeders</b> | <b>Predatory Fish Feeders</b> |
|-----------------------|--------------------------------------|-------------------------------|
| Black Bullhead        | Bluegill Sunfish                     | Bowfin                        |
| Blacknose Redhorse    | Crappie                              | Chain Pickerel                |
| Carp <sup>1</sup>     | Paddlefish                           | Largemouth Bass <sup>2</sup>  |
| Catfish               | Redear Sunfish                       | Longnose Gar                  |
| Freshwater Drum       | Rock Bass                            | Shadow Bass                   |
| Suckers               | Trout                                | Smallmouth Bass <sup>2</sup>  |
| Stonerollers          |                                      | Spotted Bass <sup>2</sup>     |
|                       |                                      | Walleye                       |
|                       |                                      | White Bass                    |

<sup>1</sup> State-wide advisory for fish over 21 inches in length.

<sup>2</sup> State-wide advisory for fish over 12 inches in length.

### **Health Effects of Mercury**

The organic form of mercury, methylmercury, is extremely toxic to humans. Health effects of eating methylmercury-contaminated fish include, in cases of high levels of exposure, impaired central nervous system function, kidney damage and failure, and gastro-intestinal damage. At lower exposures, developmental delays may occur in children. In some repeated poisoning incidents, people who ate contaminated fish or seed grains with high levels of methylmercury developed permanent damage to the brain, kidneys, and growing fetus. More recent studies have found that, along with being a neurotoxin, methylmercury increases risk for cardiovascular diseases.



## Nationwide Consumer Information on Mercury

### *EPA's National Non-commercial Fish Advisory for Mercury*

In case of no local advisory, consumers are advised to restrict fish consumption of locally caught fish to **one (1) eight ounce meal a week**

(See: <http://www.epa.gov/waterscience/fishadvice/1-meal-per-week.pdf>)

Because not all waters in the United States are monitored, the noncommercial fish consumption advice is a baseline of protection. This simplified advice balances risks from mercury with the benefits of eating fish. Consumers are encouraged to use more detailed information for the waterbodies on which they fish, and the fish species that they consume. Mercury concentrations in fish vary considerably from waterbody to waterbody and region to region. Consumers should, first and foremost, consider any local advisories.

### *Consumer Advisory for Mercury in Commercial Fish*

The U.S. Food and Drug Administration and the EPA have also issued a joint consumer advisory (FDA News Release, March 19, 2004) recommending that **women who are pregnant, women of childbearing age who might become pregnant, nursing mothers and young children NOT EAT any shark, swordfish, King Mackerel, or tilefish. They should also LIMIT CONSUMPTION of albacore "white" tuna to no more than six ounces (one average meal) per week because of mercury contamination.**

See this EPA link for more information: <http://www.epa.gov/waterscience/fishadvice/advice.html>

## MISSISSIPPI & MISSOURI RIVERS ADVISORY--Chlordane, PCBs, Mercury

For the 2006 Fish Advisory, DHSS evaluated the latest health-risk information about polychlorinated biphenyls (PCBs) and chlordane, guidance available from the EPA, the Great Lakes Sport Fish Advisory Task Force, and other sources. Because MDC and DNR do not collect information on total PCBs, DHSS is in the process of revising the PCB health-risk information. PCB and chlordane toxicity information was reviewed in conjunction with the fish tissue data collected this year and previous years by MDC and MDNR. Because DHSS also reviews fish advisories and advisory methodology from adjacent states that share water bodies with Missouri such as the Mississippi River, we also reviewed data from the Illinois Environmental Protection Agency



For 2006, DHSS is continuing the PCB and chlordane **Level-Five consumption advisory**

**(do not eat) for Shovelnose Sturgeon eggs** based on revised chlordane health-risk information.

DHSS' PCB health-risk information base is still preliminary, therefore for fish tissue evaluation, we are still using the Food and Drug Administration (FDA) screening value or health standard for total PCBs. **Therefore, because of the combined adverse health effects from PCBs and chlordane, DHSS recommends that all consumers avoid consumption of sturgeon eggs.** Chlordane levels



were also found to be elevated in some sturgeon tissue samples. Based on updated information for chlordane and PCBs, we have modified the advisory on sturgeon **fish tissue (excluding eggs)** to a **Level-Four limited-consumption advisory (no more than one meal a month) for all consumers.**

In addition, PCBs, chlordane, and mercury are also found in fish tissue at levels that require a limited-consumption advisory for other fish species on the Mississippi and Missouri rivers. Therefore, for



2006, DHSS has added a **Level-Three limited-consumption advisory (no more than one meal a week) for Flathead, Channel, and Blue catfish species** to the Mississippi and Missouri rivers advisory. This advisory is for **all consumers**. Tributaries to the Missouri and Mississippi rivers are not included in this advisory because DHSS has little information on these fish in these tributaries.

Because fish migrate to and from these major rivers, anglers should consider these advisories when fishing near mouths of tributaries.

### Health Effects of Chlordane and Polychlorinated Biphenyls (PCBs)

Chlordane and PCBs are similar in their health effects. Both could potentially cause cancer. If ingested, both affect the liver and digestive system. PCBs differ from chlordane in that they cause acne and possibly affect the nervous system in humans. Also, PCBs can cause 1) decreased hemoglobin and number of red blood cells, 2) serum hyperlipidemia (excess of lipids in the blood due to a disorder in lipid metabolism), and 3) leucocytosis (increased number of leukocytes or white blood cells).

### BIG AND FLAT RIVERS, BIG CREEK ADVISORY--Lead

For **all consumers**, DHSS is continuing its **Level-Five** consumption advisory (**do not eat**) for **all species of sunfish (locally known as bream or perch), carp, redhorse, and other suckers found in the Big River in St. Francois and Jefferson counties, and the Flat River in St. Francois County from Highway "B", six miles downstream to where it enters the Big River. In addition, DHSS has a Level-Five consumption advisory for all species of sunfish from Big Creek near the town of Glover in Iron County, Missouri.** These fish have been found to contain **lead** at levels of significant health concern, and **DHSS recommends that these fish not be eaten.**



Since 1980, DHSS has recommended that people not eat carp, redhorse, or suckers from the Big River downstream from Desloge to the mouth of the river where it enters the Meramec River because lead-mine waste piles in the area have contaminated the rivers with lead at levels of health concern. For a few years in the late 1980s, we also found catfish that were contaminated with lead at levels of health concern. Sampling since 1992, however, indicates that **catfish no longer pose a health risk**. Sunfish were captured and analyzed for the first time in 1993 and were also found to be contaminated. The MDC is continuing to sample fish from these waters and that sampling indicates that sunfish, carp, redhorse, and other suckers in the Big River and Flat River are still contaminated with lead at levels of health concern. State officials believe that lead released from a nearby lead smelter has contaminated the sunfish in Big Creek near Glover.







## Health Effects of Lead

Children are more susceptible than adults are to lead poisoning. The nervous system is susceptible to lead exposure in adults, and particularly in children. Lead exposure may impair mental and physical development, decrease hemoglobin synthesis, impair hearing, and decrease serum levels of vitamin D. Lead is most dangerous to the unborn and young children, because it affects mental abilities and reduces growth. In addition, unborn children are at risk of premature birth and low birth weight. In children and adults, low levels of lead can cause weakness in fingers, wrists, or ankles. Lead also damages the kidneys and immune system.

## ALL OTHER WATER BODIES

DHSS has a **Level-One** consumption advisory (**safe for unrestricted consumption**) for **catfish, buffalo, freshwater drum, suckers, paddlefish, and other sport fish.**

**These fish may be consumed in unlimited quantities except for the areas mentioned earlier and for sensitive populations.**



Some fish such as sunfish and crappie do not grow to large size and are lower on the food chain (see Additional Mercury Information). They are less likely to contain contaminants that accumulate in the muscle or fat tissue than the fish discussed previously.

With the exception of sensitive populations and areas discussed previously, these fish also can be consumed in unlimited amounts. **As stated in the EPA *National Fish Advisory for Mercury*, in the absence of a local advisory, individuals in the sensitive populations should consume fish at rate of one (1) eight-ounce (uncooked) meal per week.** For more information go to: <http://www.epa.gov/waterscience/fishadvice/1-meal-per-week.pdf>



To help you identify fish species, see the Missouri Department of Conservation's website at the following address:  
[http://mdc.mo.gov/documents/fish/2\\_010.PDF](http://mdc.mo.gov/documents/fish/2_010.PDF)

## GENERAL INFORMATION

### General Rules to Follow

Don't stop eating fish. Smaller fish have lower levels of contamination than larger fish of the same species. Eat the smaller, legal-size fish and release the lunkers so they can fight another day.

### Posted Signs

If warning signs are posted, follow those guidelines. **Specific warnings are special cases.**



## How to Prepare Fish

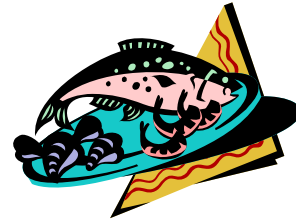
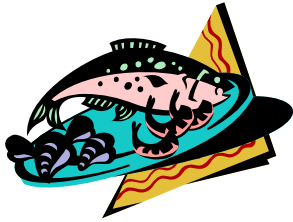
The levels of some chemicals in any of the fish that you eat can be reduced by carefully trimming away the fat when the fish is cleaned (*See attached trimming and cooking guide*). **Note:**

**Trimming fat will not reduce lead or mercury contamination. Cooking cannot eliminate mercury or lead.**

## Benefits of Eating Fish Exceed the Risks

If these guidelines are followed, you will minimize your potential health risks, but in an industrial society like ours, there are numerous other health risks. For example, approximately one person out of three or four will get some type of cancer in their lifetime. The cause may be from a family history of cancer, radiation from the sun, lifestyle exposures such as smoking cigarettes or chewing tobacco, man-made chemicals, naturally occurring chemicals or other known or unknown causes. We believe that in comparison to many of these risks, the risk from eating fish is smaller, and that for most consumers and for most fish, the benefits of eating fish exceed the risks.





## TRIMMING AND COOKING YOUR FISH TO REDUCE FAT AND CHEMICAL CONTAMINANTS

1. Fillet your fish, or if cooking with the bones in, remove all internal organs.
2. Trim away fatty portions of the fish such as the dorsal, lateral, and belly area. (See diagram below.)
3. Remove the skin from your fish.
4. Do not eat the eggs. They are very high in fat.
5. Bake, grill, or broil your fish on a rack and let the fat drip away. Do not use the juices. Avoid pan-frying in butter or animal fat, or making soups or chowders. These methods retain fat-laden juices. If you deep-fry your fish, do not reuse the oil. Contaminants will become concentrated in that oil.
6. Trimming fat or special cooking methods will not reduce the levels of metals such as lead or mercury from fish.

